

## TAXONOMIC NOTES ON THE DILARIDÆ (NEUROPTERA)<sup>1</sup>

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The little-known family Dilaridæ has been represented in the New World by two genera, *Nulema* and *Nallachius*. *Nulema*, which is based upon *championi* Navas (1914), from Guatemala, is very close to *Nallachius* and may turn out to be synonymous with it. *Nallachius* has included seven species from the Neotropical and Nearctic regions. Its genotype, *prestoni* McLachlan, has been inadequately known, the type of the species only recently becoming available for study at the British Museum. In reply to my inquiry about this type, Mr. D. E. Kimmins kindly sent me excellent drawings of its venation and abdomen. On the basis of this information and the examination of specimens of other species in the Museum of Comparative Zoölogy, I am redefining here the genus *Nallachius*, with a review of the known species; describing a new species of *Nallachius* from Paraguay; and proposing a new genus for one of Banks' species from Colombia.

Navas' grouping of the dilarid genera into two tribes, Dilarini and Nallachiini, was mainly based upon the width of the subcostal space and the number of subcostal veinlets. In all probability, however, the width of the subcostal space is merely correlated with the size of the insect and does not represent a phylogenetic division of the family. On the number of subcostal veinlets Navas was clearly in error, for in this respect not even the genotype of *Nallachius* fits his definition of the genus. He also pointed out that whereas all the Dilarini are restricted to the Old World, the Nallachiini occur exclusively in the New World. This is no longer true, however, for *hermosa* Banks, from Colombia, obviously falls into the Dilarini. In defense of Navas' classification, however, it should be noted that there are certain general differences

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between the members of the tribes Dilarini and Nallachiini. The former are relatively large, with a wing expanse of 20 mm. or more, whereas the Nallachiini have a wing expanse of less than 10 mm. Furthermore, the wings and antennæ of the Dilarini show much less sexual dimorphism than they do in the Nallachiini. But these are differences in degree and will undoubtedly break down as more species are known. I believe that a more satisfactory and distinctly phylogenetic division of the family might be attained on the structure of the male genital armature and of the media and cubitus of the wings, as in other families of the Neuroptera (Hemerobioidea and Raphidioidea; see Carpenter, 1935, 1940). Some evidence for this has already been obtained and will be presented in a later paper on the Dilaridæ.

#### Genus *Nallachius* Navas

*Nallachius* Navas, 1909, Mem. Real. Acad. Ciénc. Art. Barcelona, 7(17): 665; Navas, 1914, Gen. Insectorum, 156: 11.

*Male*: antennæ with long pectinations (usually 9–12). Fore wing distinctly triangular, coastal space of moderate width, traversed by numerous branched or unbranched veinlets; subcostal space narrow, with from 2–7 short veinlets; Rs usually with 4–5 main branches; MA always anastomosed proximally with Rs. Hind wing about two-thirds as long as the fore wing; Rs usually with one main branch less than in the fore wing. Genital armature consisting of a transverse proximal plate, two pairs of slender processes extending posteriorly from the plate, and a median ædeagus.

*Female*: antennæ filiform, as in other female Dilarids. Fore wing: more slender than that of the male, but with essentially the same venation. Hind wing: about two-thirds the length of the fore wing. Venation as in the male.

Genotype: *Dilar prestoni* McLachlan.

Navas' diagnosis of this genus is not entirely satisfactory. His statement that the subcostal space of the fore wings contains almost no veinlets, in contrast to the

several veinlets in *Dilar*, etc., is not true; even in the type of *prestoni* there are seven subcostal veinlets. *Nallachius* is undoubtedly a valid genus, however. It differs from *Dilar* and the other Old World genera by the triangular fore wings of the male, the long antennal pectinations of the male, the smaller number of cross-veins in the fore wings, the reduced hind wings of both sexes, the sexual dimorphism of the wings, and especially the male genital armature. It is impossible to give a more precise generic diagnosis at this time because of the few species known in the genus. In addition to *prestoni* the genus includes *americanus* McL., *pulchellus* Banks, *bruchii* Navas, *loxanus*

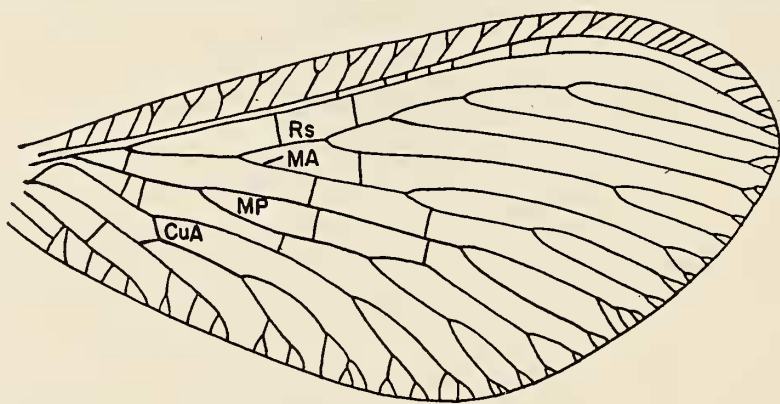


Figure 1. *Nallachius prestoni* (McL.). Drawing of fore wing of the type (♂) in the British Museum (made by D. E. Kimmins). Lettering (original): Rs, radial sector; MA, anterior media; MP, posterior media; CuA, anterior cubitus.

Navas, and *reductus*, n. sp., described below; and of these only *americanus* and *pulchellus* are known (in the literature) by both sexes. Furthermore, in the course of making this study, I have noted that the fore wings of *americanus* (and presumably also of *loxanus*) differ from those of the other species mentioned by having the posterior branch of MP anastomosed with CuA for a short interval. This is a very striking and unusual characteristic to find in the Neuroptera, and may turn out to be of generic significance, when the venation of *loxanus* is known for certain.

The male genital structures show only slight differences in the several known species of the genus. In all probability they will not be as useful in specific taxonomy as venational details.

*Nallachius prestoni* (McLachlan)

## Figure 1

*Dilar prestoni* McLachlan, 1880, Ent. Mon. Mag., 17: 39.  
*Nallachius prestoni* Navas, 1909, Real. Acad. Ciénc. Art.  
 Barcelona, 7(17): 667.

I have seen no specimens of this insect, but include here a drawing of the fore wing made from the type (♂, Rio de Janeiro, Brazil) by Mr. D. E. Kimmins, of the British Museum (Natural History). Photographs of the wings

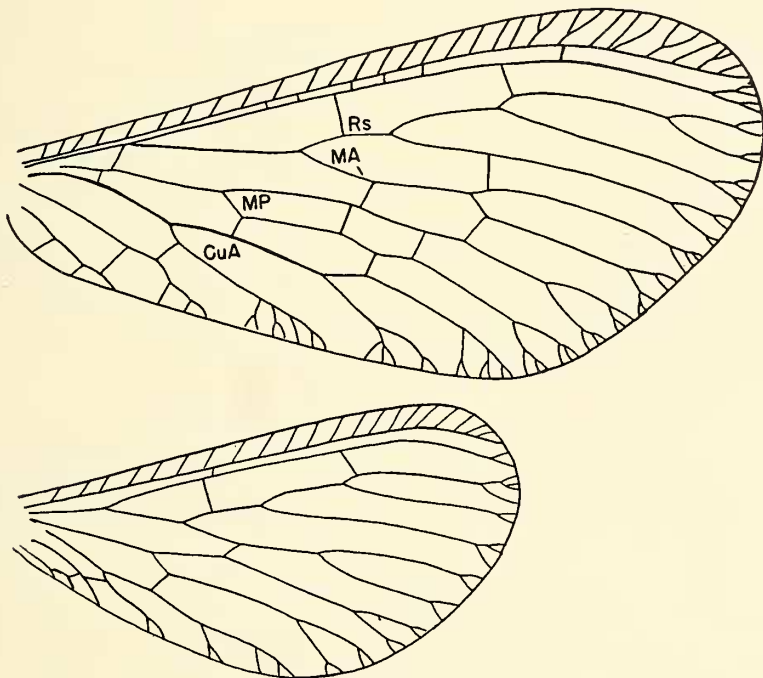


Figure 2. *Nallachius pulchellus* (Banks). Drawing of fore and hind wings of type (♂) in the Museum of Comparative Zoölogy.

of *prestoni* are reproduced in Professor Da Costa Lima's *Insectos do Brasil*, tome 4 (1943), figures 54 and 55. As shown in figure 1, there are seven short cross-veins in the subcostal space, and five main branches of the radial sector (not including MA). The posterior branch of MP is not anastomosed with CuA. Mr. Kimmins also kindly sent me a drawing of the terminal abdominal structures, which closely resemble those of *N. americanus* (Carpenter, 1940, fig. 74).

*Nallachius pulchellus* (Banks)

## Figure 2

*Dilar* (*Nallachius*) *pulchellus* Banks, 1938, Rev. de Ent., 9: 289.

*Nallachius pulchellus* Carpenter, 1940, Proc. Amer. Acad. Arts Sci., 74: 274.

I include here a drawing of the fore and hind wings of the male. The venation is much more open than that of *prestoni*, there being only three main branches to Rs, and less secondary branching of all veins. The posterior branch of MP is independent of CuA, as in *prestoni*. Most of the costal veinlets are unbranched, but this is probably variable in individuals. The male genital armature is surprisingly like that of *prestoni*, though the ædeagus is relatively longer (Carpenter, 1940, fig. 75c).

The types (♂♀) of *pulchellus* were collected at Soledad (Cienfuegos), Cuba, May 4, 1930, and an additional male was recorded by me in 1940 from the Santa Rita Mountains (5000–8000 ft.), Arizona.

*Nallachius bruchi* Navas

*Nallachius bruchi* Navas, 1923, Arx. l'Inst. Ciénc. Barcelona, 7: 195.

This species is known only by the female type, from Alta Gracia (Cordoba), Argentina, and originally deposited in the Navas collection. Navas did not figure the wings and I doubt that the species can be recognized from his description. However, it is clear from his account that the posterior media ("procubito") is not anastomosed with CuA.

*Nallachius reductus*, n. sp.

## Figure 3

*Male*: antennæ very pale yellow and with long pectinations as characteristic of the genus; eyes very dark brown or even black; head and prothorax light brown; legs pale yellow, with dark brown at distal end of tibia. Fore wing: length, 5 mm.; greatest width, 2.2 mm.; relatively more

slender than that of *prestoni*, and its hind margin less rounded; membrane hyaline, with numerous faint and irregular gray spots; only a few costal veinlets forked; end of Sc and R1 not so strongly curved as in *prestoni*;

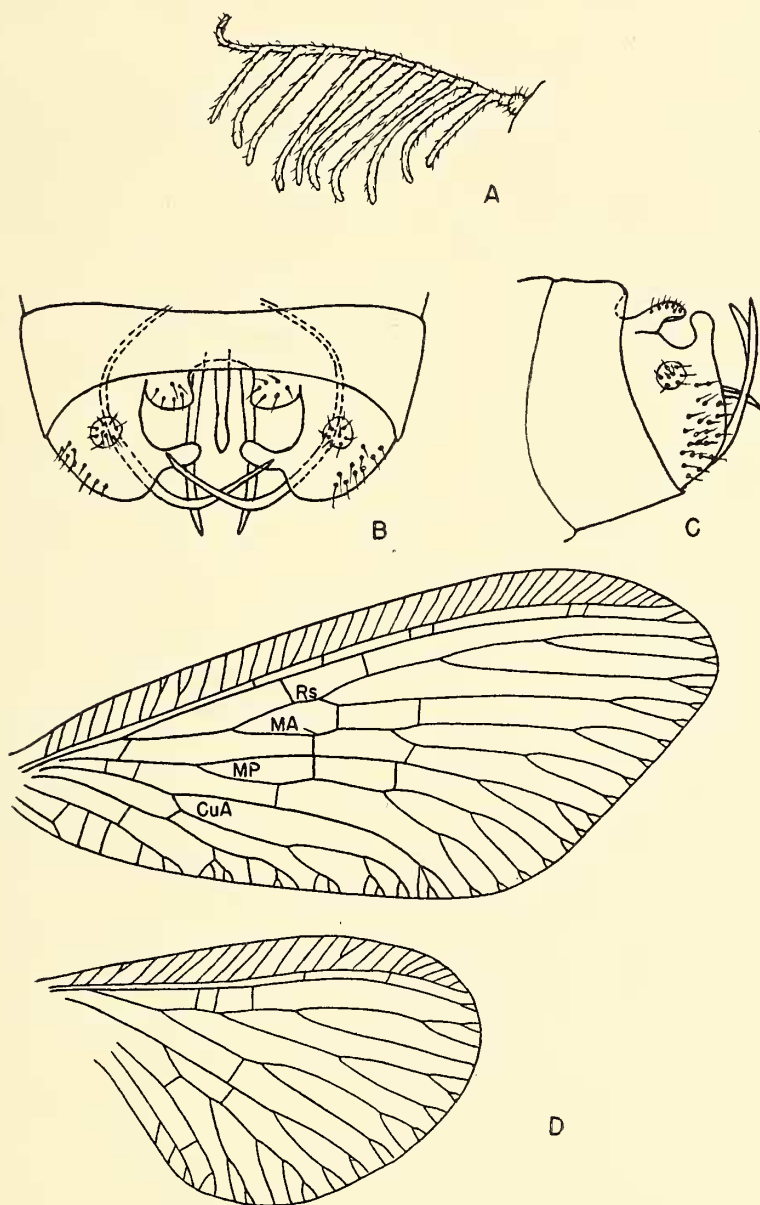


Figure 3. *Nallachius reductus*, n. sp. A, antenna; B, terminal part of abdomen, dorsal view; C, same, lateral view; D, fore and hind wings. All drawings made from the type (♂) in the Museum of Comparative Zoölogy.

R<sub>s</sub> (of type) with four main branches; media, cubitus and cross-veins as in *prestoni*, there being no anastomosis between the posterior branch of MP and CuA. Hind wing: length, 3 mm.; width, 2 mm.; broadly oval; costal area relatively broad; R<sub>s</sub> (in type) with three main

branches. Genital armature as shown in figure 3, B, C; ædeagus longer than in *prestoni*.

Female unknown.

Holotype (♂): No. 27664, Museum of Comparative Zoölogy; collected at Ualyaia, Paraguay; October (F. Schade).

This species has much fainter wing markings than *prestoni*, the wing as a whole appearing smoky. The 10th abdominal segment has more pronounced lobes than in *prestoni*, and the ædeagus is shorter. The hind wing is much more reduced than that of *prestoni*.

#### *Nallachus americanus* McL.

#### Figure 4

*Dilar americana* McLachlan, 1881, Ent. Mon. Mag., 18: 55; Banks, 1905, Trans. Amer. Ent. Soc., 32: 24.

*Nallachus americanus* Navas, 1909, Mem. Real. Acad. Ciénc. Art. Barcelona, 7(17): 667; Carpenter, 1940, Proc. Amer. Acad. Arts. Sci., 74: 273; Steyskal, 1944, Psyche, 51: 183.

The male genital armature and wings of both sexes were figured in my 1940 revision, but I include here drawings of the wings of the male in order to call attention to the anastomosis of the posterior branch of MP with CuA in the fore wing. The amount of anastomosis appears to be constant in the species. So far as I am aware, this venational peculiarity is unknown in the Old World Dilarids, though it does exist in *N. loxanus* Navas, from Ecuador. If it were not for the striking similarity of the male genitalia of *americanus* and *prestoni*, I would consider this sufficient to separate the two generically. It is noteworthy, also, that there are fewer subcostal cross-veins in *americanus* than in *prestoni*.

The surprising collection of twenty-seven specimens of *americanus* in Detroit, Michigan, has already been noted by Steyskal (1944). The species is now known to occur in Kentucky (type), Maryland, Virginia, and Michigan.<sup>2</sup> In the Museum of Comparative Zoölogy there is also a

<sup>2</sup> But not California, as stated by Navas (Gen. Insectorum, 156: 1; 1914).

male from El Yunque, c. 3000 ft., Puerto Rico, May, 1931 (P. J. Darlington). This is an unexpected extension of the range, but careful study of the specimen, including the genitalia, fails to show any differences of a specific nature.

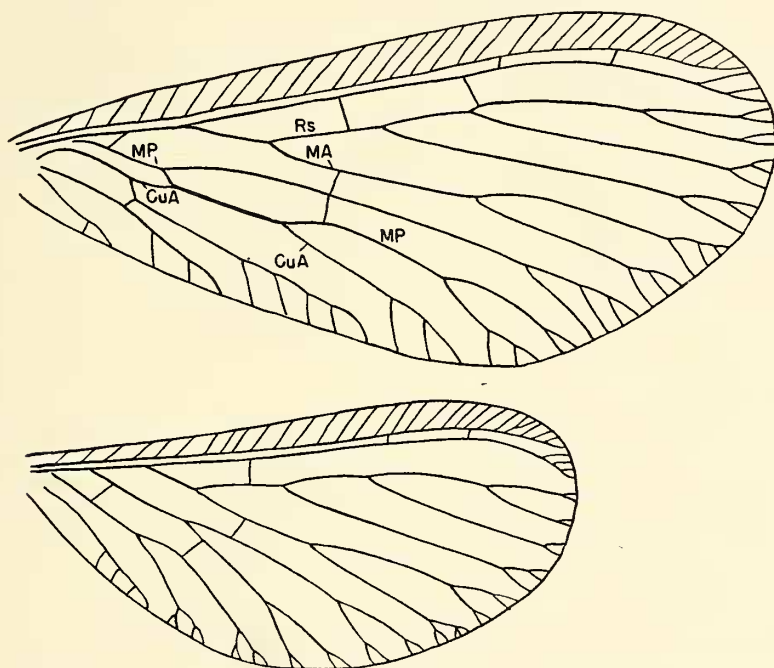


Figure 4. *Nallachius americanus* (McL.). Drawing of fore and hind wings of a male, collected at Detroit, Michigan, June 28, 1944 (Geo. Steyskal), and now in the Museum of Comparative Zoölogy.

#### *Nallachius loxanus* Navas

*Nallachius loxanus* Navas, 1911, Ann. Soc. Sci. Bruxelles, 25: 219.

This is known only from the male type, which was collected at Loja, Ecuador, in 1909, and is now in the Muséum National in Paris. Navas' crudely drawn figure of the wings shows that the posterior branch of the anterior media is anastomosed with the anterior cubitus, as in *americanus*, although the amount of anastomosis is not indicated. According to his drawing, the hind wing is much more slender than that of *americanus*.

#### Neodilar, new genus

Probably more closely allied to *Dilar* than to *Nallachius*.  
*Female*: Body structure essentially as in *Dilar* as far as



known.<sup>3</sup> Fore wing: short and triangular; venation much as in *Dilar*, the veins with many secondary branches, but with very few cross-veins, and a short anastomosis of the

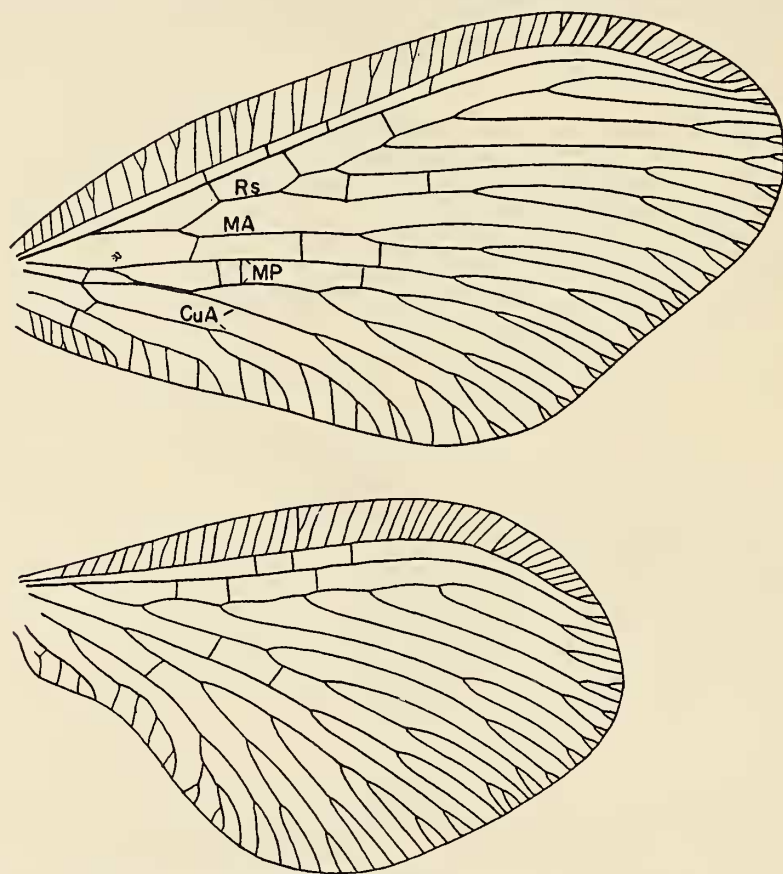


Figure 5. *Neodilar hermosa* (Banks). Drawing of fore and hind wings of the type (♀), in the Museum of Comparative Zoölogy.

posterior branch of MP and CuA. Hind wing: short and very broad; costal space also very wide. Male unknown. Genotype: *Dilar hermosa* Banks.

*Neodilar hermosa* (Banks)

Figure 5

*Dilar* (*Nallachius*) *hermosa* Banks, 1913, Trans. Amer. Ent. Soc. 39: 220.

Banks has given a complete description of this insect, but I include here drawings of the fore and hind wings, which have not previously been illustrated. They show a combination of certain characteristics of *Dilar* and *Nallachius*. The maculations on the wings resemble those of

<sup>3</sup> The antennæ are broken off in the type of *hermosa*.

*N. prestoni* in size, being larger than the ones occurring in *Dilar*. The triangular fore wing, short hind wing, the small number of cross-veins and the anastomosis of MP3+4 and CuA are also suggestive of *Nallachius*. On the other hand, the relatively large size (wing expanse, 25 mm.), and especially the very extensive secondary branching of the veins are suggestive of *Dilar*. The latter characteristic is probably the most significant of these, and until the male is found, we may assume the closest affinities are with the Old World Dilarids.

The female type (which is in the Museum of Comparative Zoölogy) is the only specimen of this insect known to me; it was collected at Pacho, E. Cordilleras, Colombia, elevation 6600 ft.